cation including site, date, climatic data, chemical formulation and dosage, carrier and volume, spraying pressure, spray equipment and personnel.
   c. Adequate training of supervisory and operating personnel in proper procedures.
2. By operating procedures (1,2)
   a. Proper choice of chemical, formulation and dosage.
   b. Proper equipment and application methods.
   c. Adherence to wind direction and velocity precautions.

SUMMARY

Herbicides generally are and will continue to be used safely to minimize associated personal, environmental and crop hazards. The most common hazard is injury to agricultural crops in which appearance, yield or quality are affected. This damage usually results from improper application traceable to personnel and operating procedures. Effective organization and operating methods reduce all hazards.

REFERENCES

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2. ---------- 1963. Use 2,4-D safely. University of Florida Everglades Station Mimeo Report EES 64-12.

Use 2,4-D Safely [1/]

*Everglades Station Mimeo Report EES*64-12

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By

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Chlorophenoxy herbicide (2,4-D) injury to susceptible vegetable crops in the Everglades farming area increased greatly during the past year. Much of this crop damage was related to sugarcane weed control operations. Additional cases of crop exposure may have been undetected or ignored.

Poorly controlled use of 2,4-D (and 2,4,5-T) is a direct, immediate hazard to vegetable production in the area.

AGRICULTURAL CROP DAMAGE

The most common damage is visible: vegetable appearance, quality and yield are affected. Contamination with illegal residues is a new and more subtle form of damage to food crops. A 2,4-D tolerance has been established for only one vegetable.

NON-AGRICULTURAL CROP DAMAGE

Many plants of urban areas; ornamentals, home gardens and nurseries, are susceptible also to damage by chlorophenoxy herbicides.

DETECTION AND IDENTIFICATION OF DAMAGE

Positive determination of 2,4-D damage is not always simple since diseases, insects, viruses and cultural and climatic conditions may cause plant responses similar to herbicide injury. It is likely that minor cases of chlorophenoxy herbicide damage are not perceived. Primary detection of 2,4-D injury is based on visual symptoms in crops. Injury is characterized most commonly by petiole epinasty and deformities of expanding and new leaves, and, in some cases, stem, root and fruit abnormalities. Plants without visible symptoms, or those apparently recovered, may have sustained damage not manifested until harvest when losses in yield and quality are noted. Fruit abnormalities are found often in tomato and snapbean exposed to 2,4-D drift. Included among susceptible crops are: cabbage, celery, eggplant, lettuce, okra, pepper, radish and southern pea.

New analytical methods permit chemical detection of minute quantities of 2,4-D in or on plant tissue.

CAUSES OF 2,4-D DAMAGE

The immediate cause of damage usually is the physical drift of spray particles, as an aerosol or mist, from the treatment site to sensitive plants. Vaporization and vapor drift after application are less common causes.

The underlying cause of damage may be traced to personnel and operating procedures. Safe use of 2,4-D requires properly trained and supervised personnel, knowledge of susceptible crop locations, proper chemical formulation and dosage, proper application equipment and operation, and, attention to wind conditions.

Fine particles of spray mist can drift or be wind-borne for considerable distances. Damage symptoms in tomato and southern pea have been noted several miles from cane fields receiving aerial sprays of 2,4-D.

AVOID CAUSING 2,4-D DAMAGE BY:

1. Effective organization
   a. Establish and maintain up-to-date a base map of fields and adjacent areas, particularly indicating location of nearby (1 - 2 miles) vegetable crop fields. Note safe wind direction and velocity for 2,4-D application in each field.
   b. Maintain an accurate log or record of each 2,4-D application including date, wind direction and velocity, formulation and dosage, water volume, spraying pressure, spray unit number and personnel for each treated field.
   c. Train supervisory personnel in proper spraying procedures and stress their responsibility for safe application and continued supervision of crews.
2. Effective procedures.
   a. Use the proper 2,4-D (and/or 2,4.5-T) formulation. Amine salts are preferred and practically preclude vapor-type injury. Low-volatile esters usually are satisfactory. Never use other esters.
   b. Use proper chemical dosage. Never apply more than the cleared rate (2 lb./A acid equivalent for 2,4-D) and use a lower rate if it will control the problem weeds.
   c. Use proper equipment. Crop damage can be minimized or avoided by preventing spray drift during application. The most effective way to prevent drift is to increase spray droplet size; adhere to the following:

      Adjust boom height as low as possible consistent with good spray coverage of weeds. Use a brush boom sprayer.

      Use correct nozzles — large-diameter orifice flat-fan herbicide or flat-fan flooding tips. Cone tips should not be used; they develop a wide range of droplet sizes and cause excessive misting.

      Operate at low spraying pressures — not over 25 psi at the nozzle tips.

      Use low volume sprays — in water at 10 - 20 gallons of spray per acre.

Use fastest practical sprayer speed which permits use of large-orifice tips, low pressure and low volume.

d. Restrict acreage treated daily. Do not cover more than 10% of any farm unit per day except when fields are well isolated; this practice will reduce atmospheric contamination near the treated fields and also downwind.

e. Observe wind direction and velocity precautions[3] Chlorophenoxy herbicides should not be applied within one-half mile of susceptible crops except under the most carefully controlled and supervised conditions. These chemicals should not be applied when the wind velocity at boom height exceeds 8 mph in isolated areas or when wind exceeds 4 mph when sensitive crops are grown less than 2 miles downwind. Application should be avoided during periods of unsettled weather and when variable winds, strong temperature inversions and turbulent weather exist or are anticipated.

AERIAL APPLICATION

Ground equipment is preferable for most of the local sugarcane, pasture and sod area. Aerial spraying of chlorophenoxy herbicide materials greatly increases the risk of spray drift and damage. Aerial application requires constant caution and should be utilized only in well-isolated areas under rigidly controlled conditions. Spraying should be suspended when wind velocity exceeds 5 mph at spray altitude. Aircraft wind-tip vorticies "drag" spray aerosols to turn altitudes. Strong temperature inversions and turbulent air movement prevent drift control. Flight patterns should conform to crop conditions and ferry flights should avoid vegetable crop areas.

CONSEQUENCES OF MISUSE

Chlorophenoxy herbicides are valuable, economical tools for control of broadleaf weeds in sugarcane, pastures, sod, rights-of-way and waterways. Careless use causes sensitive plant damage, unfavorable publicity, damage claims, litigation and needless expense. Repeated, indiscriminate use and frequent crop damage could lead to legislation restricting the use of these herbicides. More than 10 states currently have laws pertaining to chlorophenoxy herbicide use. Unfortunately, legislation is not a cure-all nor is it a guarantee preventing damage.

1/ This mimeo details and repeats previous cautions on the use of 2,4-D.

2/ Associate Horticulturist, University of Florida Everglades Experiment Station, Belle Glade, Florida.

3/ Pocket or portable wind guages are useful. One type is available as a "Pocket Wind Meter" from the F. W. Dwyer Mfg. Co., Michigan City, Indiana.

Strict Liability

By

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No conception can be understood except through history; and of no legal conception in Anglo-American law is this more true than of the notions of Responsibility for tortious Acts.[1] The early law of torts was not concerned primarily with the moral responsibility, or fault of the wrongdoer. It occupied itself chiefly with keeping the peace between individuals, by providing a remedy which would be accepted in lieu of private vengeance.[2] While it is probable that even from the beginning the idea of moral guilt never was entirely absent from the minds of the judges,[3] it was not the most important consideration. Originally the man who hurt another by pure accident, or in self defense, was required to make good the damage inflicted. "In all civil acts," it was said, "the law doth not so much regard the intent of the actor, as the loss and damage of the party suffering."[4] There was a general feeling that "he who breaks must pay."[5]

Until about the close of the nineteenth century, the history of the law of torts was that of a slow, and somewhat unsteady, progress toward the recognition of "fault" or moral responsibility as the basis of the remedy. With a growing moral consciousness in the community, there was a general movement in the direction of identifying legal liability with conduct which would not be expected of a good citizen.[6] This tendency was so marked that efforts were made by noted writers to construct a consistent theory of tort law upon the basic principle that there should be no liability without fault.[7]

But "fault," in this sense, never has become quite synonymous with moral blame. "Fault" is a failure to live up to an ideal conduct to which no one conforms always, and which may be beyond the capacity of the individual. It may consist of sheer ignorance, lack of intelligence or an honest mistake. It may even consist of acts which are normal and usual things in the community.

In this broad sense, "fault" means nothing more than a departure from a standard of conduct required of a man by society for the protection of his neighbors, and if the departure is an innocent one, and the defendant cannot help it, it is none the less a departure and a social wrong. The distinction still remains between the man who deviated from the standard, and the man who has not.

In this sense there is "fault" in much innocent conduct. Tort liability never has been consistent with the ignorance which is bliss or the good intentions with which the road to hell is said to be paved. A trespasser is not excused by the honest reasonable belief that the land is his own; an innocent purchaser of stolen goods is held liable for conversion; the publisher of a libel commits a tort, although he has no means of knowing the defamatory nature of his words. And there are many other situations in which a careful person is held liable for an entirely reasonable mistake. In all this there is nothing new. Socially these defendants are at fault.

But beyond this, the twentieth century has witnessed the overthrow of the doctrine of "no liability without fault," even in the legal sense of a departure from reasonable standards of conduct; and a general acceptance of the principle that in some cases the defendant may be liable, although he is not only charged with no moral wrongdoing, but has not even departed in any way from a reasonable standard of intent or care.[8]

In areas of unusual conditions or activities, the courts have in effect recognized a new doctrine, that the defendant's enterprise, while it will be tolerated by law, must pay its way.[9] There is a strong and growing tendency, where there is blame on neither side, to ask in view of social justice, who can best bear the loss and hence to shift the loss by creating liability, where there has been no fault. An entire field of legislation, illustrated by the Workmen's Compensation Acts, has been based upon this principle.

This new policy frequently has found expression where the defendant's activity is unusual in the community, and the danger which it threatens to others is unusually great and will be great even though the enterprise is conducted with every possible precaution.

In these situations the courts have tended to lay stress upon the fact that the defendant is acting for his own purposes, and is seeking a benefit or a profit of his own